

GENERAL INDEX TO VOL. VII.

[NOTE.—Authors' and Debaters' Names in SMALL CAPS; Titles of Papers in *italics*.]

	PAGE
Acreage of California Grain Fields.....	650
Address of President, 1885.....	25
Adhesion of Belts.....	555
Aeration of Water.....	626
Aero-steam Engines.....	691, 737
Ainger's proof of economy of Steam Engine.....	685
<i>Air, Comparative Values of Surfaces for Warming</i>	361
Air-surface Condensation of Steam.....	819
Air-trap in water-piping.....	152
Alcohol Engine.....	681
Alum in water-purification.....	625
Aluminium for Springs.....	385
Ammonia-gas Engine.....	687
Analysis of Siemens Gas.....	671
ANDERSON, J. W., disc. <i>Shop-order System of Accounts</i>	471
Angles of Twist Drills.....	130
Annular Jet for Ejector.....	804
<i>Another New Steam Engine Indicator</i>	489
Anthracite culm-burning, methods for.....	390
Appendix: (I.) Charter of Meigs Elev. R. R.....	118
“ (II.) On flow of Superheated Steam through an Orifice.....	182
“ (III.) Action of Forces on Wheels of Meigs Elev. R. R.....	129a
“ (IV.) On cubic feet of air per minute in flue.....	374a
“ (V.) On modified spring forces for Indicator Drum.....	511
“ (VI.) Nagle's Tables for Belt-transmission.....	579
“ (VII.) St. Louis Training School Course.....	755
“ (VIII.) Memorial notices of Members Deceased.....	827
“ (IX.) Addresses of Welcome, XIIIth Meeting.....	831
Anot Products-of-combustion Engine.....	703
Arrangement of Casting Pits for Bessemer Process.....	64
ASHWORTH, D., disc. Drilling holes in Glass.....	393
“ “ “ <i>The Unexpected which often happens</i>	159
Atkinson, Edward, Address of Welcome.....	831
Atlantic Works CS ₂ Engine.....	684
Automatic filtration for boiler feeds.....	628
Automatic Stoker.....	790, 791, 796
Axles, effect of shock on.....	260
Babbitt-bushing, change of form in.....	153
BABCOCK, G. H., <i>Substitutes for Steam</i>	680
“ “ disc. Annular Jet for Ejector.....	805

	PAGE
BARCOCK, G. H., disc. Cams for Engine-valves.....	785
“ “ “ Condensation in Exhaust pipes.....	820
“ “ “ <i>Economy of Ventilation by Chimneys</i>	541
“ “ “ <i>Frictional Resistance of Shafting</i>	147
“ “ “ Moulds for Printing-press Ink-rolls.....	812
“ “ “ <i>Rating of Boilers by Horse-powers</i>	222
“ “ “ <i>Smoke-preventing Furnaces</i>	790
“ “ “ <i>Steam Calorimeter</i>	183
“ “ “ <i>True Crank Shafts and Bearings</i>	527
“ “ “ <i>Valve Dynamometer</i>	638
Baffle-plates in Smoke-flues.....	388
BALDWIN, W. J., <i>Note on Comparative Values of Metal Surfaces for Warm-</i> <i>ing Air</i>	361
“ “ disc. Descending Smoke-flues.....	388
“ “ “ <i>Standard Pipe and Pipe Threads</i>	323
BANCROFT, J. S., “ Packing for Pneumatic Engines.....	381
Barber's Air Engine.....	694
BARNABY, C. W., <i>Another New Steam Engine Indicator</i>	489
“ “ disc. <i>A Valve Dynamometer</i>	644
BARRUS, G. H., <i>A New Form of Steam Calorimeter</i>	178
“ “ disc. <i>Another New Steam Engine Indicator</i>	519
“ “ “ <i>Smoke-preventing Furnaces</i>	796
“ “ “ <i>Substitutes for Steam</i>	731
<i>Basic Bessemer process</i>	34
BAYLES, J. C., disc. Crystallization of Iron.....	270
Belting, affected by atmospheric moisture.....	588
<i>Belting, Experiments on the Transmission of Power by</i>	549
“ non-elasticity of.....	585
“ of raw hide.....	556, 586
“ speed of.....	582
“ stretch of.....	556
“ tightness of.....	147
“ <i>Transmission of Power by (M. I. T. Exps.)</i>	347
“ vertical, tests of.....	556
Bergner, Theodore, Memorial notice of.....	829
Binary Engine, Du Trembley.....	682
Bishop's Sack Elevator.....	656
Bisulphide-of-carbon Engine.....	684, 717, 718, 729
Blackman Fan, experiments with.....	539, 547
Blanchard's Engine, on S.S. John Faron.....	692
Blow-holes in Steel.....	250
Blow in basic Bessemer process.....	55
Blower for Smoke-stacks.....	805
Blower, power required to drive.....	822
Boilers, Rating by Horse-power of.....	214
BOND, G. M., <i>Standard Pipe and Pipe Threads</i>	311
“ “ disc. Strain in hardened Steel.....	399
“ “ “ Substitutes for Steel in Springs.....	384
“ “ “ Taper for Bolts and Pins.....	396
“ “ “ <i>The Unexpected which often happens</i>	157
“ “ “ <i>Twist Drills</i>	136

	PAGE
Bort, or black diamond for drilling Glass.....	394
BOYDEN, THOS. J., disc. <i>A Novel Chimney Staging</i>	615
" " " <i>Centrifugal and Reciprocating Pumps</i>	611
Bradley Promethor	727
Brakes for Meigs Elev. R. R.....	109
Brayton Petroleum Engine.....	701
Briggs' Standard for Pipe Threads	312
Brotherhood Coupling for Marine Engine Shafts	526
Brown Gas Engine	697
Brunel's CO ₂ Engine.....	686
Buildings, Weights of	799
Bushing of Engine Cylinder	155
Butterfield, F. E., Memorial notice of.....	827
Caley, Product-of-Combustion Engine.....	702
California, Handling Grain in.....	650
Calorimeter, A New Form of Steam.....	178
Cambering of Rails	154
Cams for Valves of Engines.....	784
Carbon-bisulphide Engine.....	717
Carbonic Acid Vapor Engine	686
Canal Gas Engine Co.....	698
Carett's Steam and Flue Gas Engine	692
Carnot's Cycle.....	710
CARPENTER, R. C., disc. Smoke-preventing Furnaces.....	791
Cars for Meigs Elev. R. R.....	103
Cartwright Ether Engine	681
Cecil Hydrogen Engine	695
Centrifugal force of High-speed Belts.....	581
Chanute's Experiments on Load on Tires	785
<i>Chimney Staging, A Novel</i>	612
Chucks for Twist Drills.....	136
CHURCH, W. L., disc. Descending Smoke-flues.....	388
" " " Non-conducting Cylinder Linings	379
Climate Conditions for Harvesting Grain	666
Cloud Engine	690
Coagulant in Water Purification.....	624
Coefficient of Friction for Belts on Pulleys.....	349
COGGIN, F. G., <i>A Novel Chimney Staging</i>	612
COLE, J. W., disc. Foundations on yielding earth.....	803
" " " Smoke-preventing Furnaces	789
" " " <i>True Crank Shafts and Bearings</i>	524
Colloid Structure of Iron.....	243
Combined Carbon in Steel.....	251
Committee on Nominations, 1886.....	405
" " Standard Pipe and Pipe Threads.....	20, 414
" " Uniform methods of test	21, 413
" " U. S. Test Commission.....	21, 413
" to Secure Reports from U. S. Government.....	410
<i>Comparative Values of Metal Surfaces for Warming Air</i>	361
Compound Engine. See Engine, Compound.	

	PAGE
Compression, Effect of, on Friction of Valve.....	643
" Engine	708
Condensation in Cylinder as effected by speed of revolution.....	379
" " Exhaust-pipes.....	816
" " Non-conducting Cylinder	375
" " Vapor Engines	724, 740
Condenser, Portable, for testing small engines	380
Contraction of Cores in Moulds	426
Converter in basic Bessemer process	37
COOPER, J. H., <i>Handling Grain in California</i>	650
Cord Tensions in Indicator Drums	502
Cost, Factor.....	456
" of basic steel.....	73
" " labor in contract and piece-work.....	432
" " product	452, 483
" " smoke-preventing Furnace.....	789
" " ventilation	544
" " water-gas	672
Coupling, flexible, for Engine Shaft	523
" for Meigs Elev. R. R.....	109
" " Pipe Threads	321
Countershafts, Uniform speed for.	146
<i>Courses in Mech. Eng'g at the Mass. Inst. Tech.</i>	338
COWLES, WM., Improvement in Ferry-boats	190
Craddock on Vapor Engine	686
CRANE, T. S., <i>The Purification of Water for Mfg. and Domestic Purposes</i> ... 617	
" " disc, <i>Substitutes for Steam</i>	717
<i>Crank Shafts and Bearings, The production of true</i>	521
Crook's Radiometer.....	154
CROTHERS, J. A., disc, <i>Crystallization of Iron</i>	268
<i>Crystallization of Wrought Iron</i>	243
Culm-burning at Scranton.....	391
Cup Leather Packing.....	383
Cutting of Contact Surfaces	281, 286
Cylinder Condensation in Steam Engines.....	375
" " " Vapor	724, 740
Dead plate for smoke prevention.....	791
Dean Bros. Valve Dynamometer.....	631
DEAN, F. W., disc, Culm-burning	392
Delaporte Ammonia Engine	688
Depreciation of Machinery Plant.....	434
DeRivaz Gas Engine.....	695
DeRochas four-cycle Engine.....	700
Descending Smoke-flues.....	387
Detent for drum-spring in Indicator... ..	498
Discharge area, effect of	824
Discussions, Rules for regulating.....	408, 419
DOANE, W. H., disc, <i>Experiments on Belting</i>	587
" " " <i>Shop-order System of Accounts</i>	484
DODGE, JAS. M., " <i>Training of Dynamic Engineer</i>	773

	PAGE
Domestic filtration of water.....	628
Double-screw for Ferry-boats.....	195
Drainage Pumps for Haarlaem lake.....	606
Drake Gas Engine.....	699
DURFEE, W. F., disc. <i>A Novel Chimney Staging</i>	616
" " " <i>Annular Jet for Ejector</i>	804
" " " <i>Basic Bessemer process</i>	78
" " " <i>Condensation in Exhaust-pipes</i>	820
" " " <i>Culm-burning</i>	390
" " " <i>Descending Smoke-flues</i>	387
" " " <i>Drilling holes in Glass</i>	393
" " " <i>Engineer as an Economist</i>	476
" " " <i>Foundations on yielding earth</i>	802
" " " <i>Mechanical circulation in Boilers</i>	815
" " " <i>Meigs Elevated R. R.</i>	121
" " " <i>Packing for Pneumatic Engine</i>	382
" " " <i>Smoke-preventing Furnaces</i>	791
" " " <i>Strain in hardened Steel</i>	398
" " " <i>Substitutes for Steam</i>	729
" " " <i>Testing small engines</i>	381
" " " <i>The Unexpected which often happens</i>	160
" " " <i>Training of a Dynamic Engineer</i>	776
" " " <i>Water Purification</i>	629
Du Trembley Ether Engine.....	682
Dynamic Engineer, Training of.....	742
Dynamic vs. Mechanical Engineer.....	765, 768
Dynamometer for tests of Belting.....	550
" " " <i>Gearing</i>	274
" " " <i>Valve Stems</i>	631
Economic Section of the A. S. M. E.....	430
Economy of Smoke-preventing Furnace.....	789
" " <i>Ventilation by Heated Chimneys and by Fans</i>	531
Effect of heat on cast iron.....	152
" " temperature on iron castings.....	425
Efficiencies of Toothed Gear.....	297
Efficiency of Disk Fan.....	547
" " <i>Centrifugal and Reciprocating Pumps</i>	598
EGLESTON, T., <i>The basic Bessemer process</i>	34
" " disc. <i>Crystallization of Iron</i>	249
Ejector, Annular Jet for.....	804
Elastic cord for Indicator Drums.....	499
<i>Elevated R. R. and Rapid Transit</i>	81
Ellis Bisulphide-of-carbon Engine.....	684
Embossed work, female Die for.....	153
Emery for drilling Glass.....	393
EMERY C. E., disc. <i>Improvement in Ferry-boats</i>	203
" " " <i>Non-conducting Lining for Steam Cylinders</i>	375
" " " <i>Rating of Boilers by Horse-powers</i>	239
Enameling of Cylinder Surface.....	379
Endowment for Experimental Research.....	589

	PAGE
Engine, compound, for Ferry-boat.....	192, 203
" for Meigs' Elevated R. R.....	105
" <i>Steam, Tests at the Massachusetts Institute of Technology</i>	328
<i>Engineer as an Economist, The</i>	428
Ericsson Air Engine and Air Ship.....	706
" horizontal grip Driving Wheels.....	124
Essen Water-gas Plant.....	677
Ether Engine.....	681
Ethics of Engineering.....	778
Exchanges, List of.....	16
Exhaust-pipe, Condensation in.....	816
<i>Experiments on the Transmission of Power by Belting</i>	549
" " " " " " <i>Gearing</i>	273
Fatigue of Metals.....	245
Ferrara Marsh Pumps.....	607
<i>Ferry-boats, Improvement in</i>	190
Fibrous structure of Iron.....	243
Filter-pump on ejector principle.....	804
Filtration of scaling waters for Boilers.....	628
" " water under pressure.....	621
Fire-brick Furnaces for Boilers.....	790
Fire-boxes on P. & R. R. R.....	392
FITCH, C. H., disc. <i>Engineer as an Economist</i>	471
" " " <i>Valve Dynamometer</i>	640
Flandrin's Ammonia Omnibus.....	687
Flexible Couplings for Lake Steamers.....	525
" Shafts for Marine Engine.....	523
Flow of superheated Steam through an orifice.....	182
Footings for Piers in yielding earth.....	801
Force of Spring in Indicator Drums.....	507
Formula for Shafting.....	142
Formule for Bisulphide-of-carbon Engine.....	720
Foundations upon yielding earth.....	797
Franchot Air Engine.....	705, 708
French Cam for Engine Valves.....	785
Friction of different Metals in Steam.....	640
" " Gearing.....	296
" " Slide-valves.....	639, 641
<i>Frictional Resistance of Shafting in Engineering Establishments</i>	138
Frot Ammonia Engine.....	687
Future possibilities of Heat Engines.....	715
GALLOUPE, F. E., <i>Rapid Transit and Elevated Railroads</i>	81
Gamgee, Zero Motor.....	699
Gantt and Maury on non-aqueous Vapors.....	735, 739, 686
Gas Engines.....	694
Gas-firing for smoke prevention.....	794
<i>Gearing, Experiments on the Transmission of Power by</i>	273
GIDDINGS, C. M., <i>A Valve Dynamometer for measuring the Power required to move Slide-valve</i>	631
" " disc. Condensation in Exhaust-pipe.....	818

	PAGE
Giffard's packing for Pneumatic Engines	381
" theory of Annular Jet	805
Gilman Steam and Flue-gas Engine	692
Gold plating of Springs	386
<i>Grain Handling in California</i>	650
Grate Areas for culm-burning	391
Grate, double, for Steam Boilers	793
Grinding Machine for Twist Drills	134
GRINNELL, F. H., disc. <i>Standard Pipe and Pipe Threads</i>	322
Gwynne Pumps	598, 607
Hall Steam and Flue-gas Engine	691
HALSEY, F. A., disc. <i>Meigs Elev. R. R</i>	122
Hammer-bar, fracture of	242, 260
Hammering, effects of, on steel	262
HAMMOND, G. W., <i>The Unexpected which often happens</i>	159
HAND, S. A., disc. <i>The Shop-order System of Accounts</i>	482
<i>Handling Grain in California</i>	650
Hardening Steel	157
HARDING, —, disc. Smoke-preventing Furnaces	794
HARRISON, W. H., disc. <i>Crystallization of Iron</i>	261
Harvesters in California	653
Haskins Mach. Co. CS ₂ Engine	684
Hausser's Header and Thresher	651
Hawkins' Steam and Flue-gas Engine	692
HAWKINS, J. T., disc. Annular Jet for Ejector	805
" " " <i>Crystallization of Iron</i>	253
" " " <i>Engineer as an Economist</i>	484
" " " <i>Experiments on Belting</i>	581
" " " Moulds for Printing-press Ink-rolls	806
" " " Smoke-preventing Furnaces	792
" " " <i>Training of a Dynamic Engineer</i>	769
" " " <i>Twist Drills</i>	135
" " " <i>Valve Dynamometer</i>	645
Heat due to impact, effect of	261
" Engines, theory of	710
Heating of Air	825
Heavy Hammers for Steel	268
Hecker Bros.' Experiments on Non-conducting Linings	378
HEMINWAY, F. F., disc. Cams for Engine Valves	784
HENTHORN, J. T., disc. <i>Frictional Resistance of Shafting</i>	143
HICKS, W. C., Memorial notice of	828
High-pressure Surface Condenser	211
HILL, WM., <i>The Crystallization of Wrought Iron</i>	241
HINES, D. S., Memorial notice of	828
Hirn's Barrel Calorimeter	186
Hock Petroleum Engine	701
Hollow Shafts for Marine Engines	523
HOLLOWAY, J. F., President's Address, 1885	25
" " disc. <i>Basic Bessemer process</i>	78

	PAGE
HOLLOWAY, J. F., disc. <i>Crystallization of Iron</i>	261
“ “ “ <i>Frictional Resistance of Shafting</i>	143
“ “ “ <i>Improvement in Ferry-boats</i>	200
“ “ “ <i>True Crank Shafts and Bearings</i>	525
“ “ “ <i>Valve Dynamometer</i>	643
Holman's Experiments on Belting.....	349
Home Ins. Building of Chicago.....	800
Howard Alcohol Engine.....	681
Hoyt's Experiment's with Bituminous Coal.....	793
Hughes' CS ₂ Engine.....	684
Hugo, T. W., disc. <i>Grain Handling in California</i>	666
Hugon Gas Engine.....	699
Hyatt Apparatus for Filtration.....	618
Hydraulic Lift in basic Bessemer process.....	41
Ice, effects of, on Ferry-boats.....	194
<i>Improvements in Ferry boats</i>	190
Impurities in basic steel.....	44
<i>Indicator, Another New</i>	489
Indicator diagram of CS ₂ Engine.....	685, 738
Inertia of Engine Valves.....	638
“ “ paper Drums of Indicator.....	500
Inspection and erection of contract work.....	470
<i>Inventory Valuation of Machinery Plant</i>	433
<i>Irregularity in the Contraction of Duplicate Iron Castings</i>	422
Isherwood on Aero-steam Engine.....	737
JENNEY, W. L. B., disc. Foundations in yielding earth.....	798
Johnson Hydrogen Engine.....	696
JONES, W. H., Memorial notice of.....	827
KENT, WM., disc. <i>A Novel Chimney Staging</i>	615
“ “ “ Condensation in Exhaust-pipes.....	819
“ “ “ Culm-burning.....	391
“ “ “ Descending Smoke-flues.....	389
“ “ “ Drilling holes in Glass.....	394
“ “ “ Engineer as an Economist.....	482
“ “ “ Experiments on Belting.....	589
“ “ “ Mechanical circulation in Steam-boilers.....	815
“ “ “ Meigs' Elev. R. R.....	123
“ “ “ Purification of Water.....	628
“ “ “ Rating of Boilers by Horse-powers.....	225
“ “ “ Relative Value of Water Gas and Siemens Gas.....	677
“ “ “ Strain in hardened Steel.....	397
“ “ “ Substitutes for Steam.....	729
“ “ “ Training of a Dynamic Engineer.....	768
“ “ “ True Crank Shafts and Bearings.....	523
“ “ “ Valve Dynamometer.....	642
KING, C. I., disc. Condensation in Exhaust-pipe.....	816
“ “ “ Moulds for Printing-press Ink-rolls.....	809
“ “ “ Smoke-preventing Furnaces.....	793

	PAGE
KING, C. I., disc. <i>Training of a Dynamic Engineer</i>	780
Kunstädter system of Propeller Rudders	194, 202
LANZA, G., <i>Course in Mechanical Engineering at the Mass. Inst. Tech.</i>	338
“ “ <i>Transmission of Power by Belting</i>	347
“ “ disc. <i>A New Steam Calorimeter</i>	184
“ “ “ <i>Testing of small engines</i>	380
Lauberau Air Engine	706
Lead Drills for Glass	393
Lébon Gas Engine	695
Lenoir Gas Engine	699
LEWIS, WILFRED, <i>Experiments on the Transmission of Power by Belting</i>	549
“ “ “ “ “ “ “ “ <i>Gearing</i>	273
“ “ “ disc. <i>Loads on Tires</i>	786
“ “ “ “ <i>Valve Dynamometer</i>	643
Library Committee, Report of	13
Limit Gauges for Pipes and Threads	317
Lines of weakness in hardened Steel	398
Lining for Chimney Stacks	615
Liquation in Steel	250
Load for Steel Tires on Steel Rails	785
“ “ on Rolling Cams	788
Locomotive, effect of, on rail	787
LOISEAU, E. F., Memorial notice of	830
Losses by friction in Shafting	139
Lubricant in water of condensation	818
Machine-gun in Riel rebellion	26
Magnesia in Feed Water	816
Magnesian Bronze for Springs	385
“ “ linings in basic Bessemer process	75
MAGRUDER, W. T., disc. Moulds for Printing-press Ink-rolls	813
Mandrel for true Crank Shafts	521
Manual Training School, St. Louis	743
Mason's Smoke-preventing Furnace	789
Material Cards in Shop-order System	452
Mechanical circulation and filtration of Water in Steam-boilers	814
Mechanical vs. Dynamic Engineering	765
<i>Meigs Elevated Railroad</i>	81
Merrill Air Engine	731
Merrill's Tests for Friction of Belts	352
METCALFE, HENRY, <i>The Shop-order System of Accounts</i>	440
<i>Microscope in the Workshop, The</i>	164
Minges' Harvester	653
MINOT, H. P., disc. Smoke-preventing Furnaces	794
“ “ “ <i>True Crank Shafts and Bearings</i>	528
Morey Camphene Engine	696
MORGAN, THOS. R., disc. <i>Experiments on Belting</i>	589
Morse recessed Socket for Pipe	322
“ “ taper for Twist Drills	135
Moulds for Printing-press Ink-rolls	806

	PAGE
NAGLE, A. F., disc. <i>A Novel Chimney Staging</i>	615
“ “ “ <i>Economy of Ventilation</i>	548
“ “ “ <i>True Crank Shafts and Bearings</i>	529
Nagle formula for belt transmission.....	562
Nevada Warehouse and Dock Co.....	660
<i>New Form of Steam Calorimeter, A</i>	178
NICHOLSON, S., disc. <i>Crystallization of Iron</i>	266
Night-schools for Engineering Apprentices.....	772
Non-conducting Linings for Engine Cylinders.....	375
<i>Notes on Comparative Values of Metal Surfaces for Warming Air</i>	361
<i>Novel Chimney Staging, A</i>	612
Occlusion of Feed-pipe in Steam Boiler.....	815
Oil-pipe lines.....	318
Oil-storage in Manufacturing Establishments.....	477
Oil-tempering of Steel-shafts.....	524
Otto and Langen Gas Engine.....	700
Packing for differential Accumulator.....	383
PALMER, G. E., disc. Foundations in yielding earth.....	801
“ “ “ Smoke-preventing Furnace.....	788
Palmer's Post-line Railroad.....	123
Paper-carrier for Indicator.....	492
PARTRIDGE, W. E., disc. <i>Engineer as an Economist</i>	469
PEABODY, C. H., <i>Steam Engine Tests at the Mass. Inst. Tech.</i>	328
Perry Gas Engine.....	699
Petroleum Engine.....	701
Phillips' Gas in O. J. Furnace.....	676
Piece-work, reduction in cost of.....	469
Piles in yielding earth.....	803
<i>Pipe and Pipe Threads, Standard</i>	311
Piping for Centrifugal Pumps.....	611
Piston for Pneumatic Engine.....	382
Pneumatic Machinery, packing for.....	381
Poole and Hunt CS ₂ Engine.....	684
Poppet-valves for Steam Engines.....	638
PORTER, C. T., disc. <i>Another New Steam Engine Indicator</i>	519
“ “ “ <i>Valve Dynamometer</i>	638
Post-line Railroads.....	123, 127
POWEL, S. W., disc. Substitutes for Steel in Springs.....	385
Power for Grain Conveyers.....	668
“ “ Textile Machinery.....	140
“ required to drive a Blower.....	822
<i>President's Address, 1885</i>	25
Proceedings, Boston (XIIIth) Meeting.....	12
“ Chicago (XIIIth) “.....	403
Producers for Steam Boilers.....	795
Products-of-combustion Engines.....	703
<i>Production of True Crank Shafts and Bearings</i>	521
Promethor by Bradley.....	727
<i>Pumps, Centrifugal and Reciprocating, Efficiency of</i>	598

	PAGE
<i>Purification of Water for Manufacturing and Domestic Purposes</i>	617
Push-and-pull Springs for Dynamometers	635
<i>Rapid Transit and Elevated Railroads</i>	81
<i>Rating of Boilers by Horse-powers for Commercial Purposes</i>	214
Raw-hide Belting.....	556
Regenerator in Air Engines.....	725
<i>Relative Economy of Ventilation by Heated Chimneys and by Fans</i>	531
<i>Relative Efficiency of Centrifugal and Reciprocating Pumps</i>	598
<i>Relative Value of Water Gas and Siemens Gas for melting in the O. H. Furnace</i>	669
Report of Committee on Finance (XIIth Meeting)	9
“ “ “ “ Library “ “	13
“ “ “ “ Standard Pipe and Pipe Threads	413
“ “ “ “ Uniform Methods of Test.....	21, 413
“ “ “ “ U. S. Test Commission.....	21, 413
“ “ Tellers Annual Meeting.....	7, 17
“ “ “ XIIIth “	411
Resistances, Meigs Elev. R. R.	112
Resolutions of Thanks (XIIth Meeting)	22
“ “ “ “ (XIIIth “).....	419
Resuscitation after Suffocation by Gas.....	730
RICHARDS, C. B., <i>Rating of Boilers by Horse-powers for Commercial Purposes</i>	214
Rider Compression Engine.....	710
“ “ “ “ performance of.....	736
ROBINSON, S. W., disc. Power to drive a Blower.....	825
“ “ “ “ Training of a Dynamic Engineer.....	774
Rogers and Black Steam and Flue-gas Engine.....	692
ROGERS, W. A., <i>The Microscope in the Workshop</i>	164
“ “ “ “ disc. A New Steam Calorimeter	188
“ “ “ “ The Unexpected which often happens.....	157
Roll trains for basic Steel.....	71
Roper's Products-of-combustion Engine.....	703
Rosenkranz Attachment to Indicator	498
Rubber packing for Pneumatic Engines.....	381
Rules of Council for regulating debate	408, 419
Safety-valve with loose bushing.....	161
Salomon's CS ₂ Engine.....	683
Sand-blast for drilling Glass.....	393
SANDERSON, R. P. C., disc. <i>Crystallization of Iron</i>	260
Sargent's Elevated R. R.	124
SCHAEFFLER, F. A., disc. Condensation in Exhaust-pipe.....	818
School-shop vs. Shop-school	761
SCHUHMAN, GEO., disc. Condensation in Exhaust-pipe.....	821
“ “ “ “ Culm-burning.....	391
“ “ “ “ Frictional Resistance of Shafting.....	147
“ “ “ “ Relative Value of Siemens and Water Gas	677
“ “ “ “ Standard Pipe and Pipe Threads	320
“ “ “ “ Substitutes for Steam.....	727

	PAGE
SCHUHMAN, GEO., disc. <i>True Crank Shafts and Bearings</i>	529
“ “ “ <i>Valve Dynamometer</i>	641
SEE, HORACE, <i>The Production of True Crank Shafts and Bearings</i>	521
“ “ disc. Improvements in Ferry-boats.....	202
SELLERS, COLEMAN, President's letter to XIIIth Meeting.....	403
“ <i>Experiments on the Transmission of Power by Belting</i>	549
“ “ “ “ “ “ “ <i>Gearing</i>	273
Service Cards in Shop-order System.....	450
Settling of buildings in yielding earth.....	798
Sewing-machine Needles.....	267
Shaft, hollow and flexible, for Marine Engines.....	523
Shafting, speed of.....	146
“ without Pulleys.....	147
Shake of High-speed Engines.....	154
Shanks of Twist Drills.....	133
Shaw Product-of-combustion Engine.....	702
Shippee combined Harvester.....	656
<i>Shop-order System of Accounts, The</i>	440
“ “ system of S. M. Co.....	472
“ “ tickets.....	446
“ work at Washington University.....	744
Sibley College post-graduate course.....	764
Siemens' Compression Engine.....	709
“ Gas for melting in O. N. Furnace.....	669
SINCLAIR, A., disc. Load on Tires.....	787
“ “ “ <i>Training of a Dynamic Engineer</i>	771
Slags in basic Bessemer process.....	68
Slip of Belting.....	348, 550
“ “ Locomotive Drivers.....	787
Smith, C., Shaler's formula for Load on Tires and Rollers.....	786
SMITH, JESSE M., disc. Annular Jet for Ejector.....	804
“ “ “ “ <i>Valve Dynamometer</i>	644
SMITH, OBERLIN, <i>Incentory Valuation of Machinery Plant</i>	433
“ “ “ disc. <i>Crystallization of Iron</i>	268
“ “ “ Drilling holes in Glass.....	393
“ “ “ <i>Engineer as an Economist</i>	479
“ “ “ <i>Experiments on Belting</i>	585
“ “ “ Foundations in yielding earth.....	802
“ “ “ <i>Frictional Resistance of Shafting</i>	146
“ “ “ Load on Tires.....	788
“ “ “ <i>Shop-order System of Accounts</i>	480
“ “ “ Strain in hardened Steel.....	397
“ “ “ <i>The Unexpected which often happens</i>	160
“ “ “ <i>Training of a Dynamic Engineer</i>	769
“ “ “ <i>True Crank Shafts and Bearings</i>	528
“ “ “ <i>Twist Drills</i>	136
Smoke-flues, descending.....	388
Smoke, prevention in Boiler Furnaces.....	788
SNELL, H. I., disc. Power to drive a Boiler.....	822
Soaking-pits in basic Bessemer process.....	78
Sockets for Pipe-joints. See Couplings.	

	PAGE
<i>Solano Ferry-boat</i>	659
SOULE, R. H., disc. Domes on Locomotive Boilers.....	386
<i>Southfield, The</i> , dimensions of S. S.....	190
Speed of Belts.....	582
" cams for Engine-valves.....	784
" feeds in Automatic Tools.....	484
" revolution affecting Cylinder Condensation.....	397
Spherical Pins for Engine-cranks.....	528
Spiral Gearing, Experiments on.....	289
" Lining for Chimney-stacks.....	615
Spooling Lathe.....	583
Standard inches compared.....	176
" <i>Pipe and Pipe Threads</i>	311
" " " " " Committee on.....	20, 414
Steam Boilers. See Boilers.	
" <i>Engine Tests at the Mass. Inst. Tech.</i>	328
" Jet for Chimney, location of.....	806
" superheated, flow of, through orifice.....	182
Steel Castings, special moulds for.....	427
" Hammering.....	249
" Liquation of.....	250
" Mechanical Treatment of.....	252
Step-bearings, Friction of.....	305
STETSON, G. R., disc. <i>Crystallization of Iron</i>	267
" " " Drilling holes in Glass.....	395
" " " <i>Standard Pipe and Pipe Threads</i>	324
" " " Strain in Hardened Steel.....	397
" " " Substitutes for Steel in Springs.....	385
" " " <i>Twist Drills</i>	133
Stirling's Air Engine.....	704
Storms' Cloud Engine.....	690
Strainer for Water Tank.....	629
STRATTON, E. P., disc. <i>Improvements in Ferry-boats</i>	203
Straw, E. A., Theory of Shafting.....	139
Street Petroleum Engine.....	701
" Turpentine Engine.....	694
Stretch of Belts.....	556
Structure of Weld Iron.....	256
Stubbs' Steel Wire.....	266
Staffing-boxes for CS ₂ Engine.....	731
Sturtevant Blower, Power for.....	822
<i>Substitutes for Steam</i>	680
Sudden Heating of Steel, Effect of.....	262
Sulphur in Pig-iron.....	811
Superheating of Vapor, Effect of.....	734
Surface Condenser at High Pressure.....	211
" " at Boiler Tests.....	185
SWEET, J. E., <i>The Unexpected which often happens</i>	152
" " disc. <i>Contraction of Iron Castings</i>	426
" " " <i>Crystallization of Iron</i>	266
" " " <i>True Crank Shafts and Bearings</i>	528

	PAGE
SWEET, J. E., disc. <i>Valve Dynamometer</i>	646
Switch for Meigs Elev. R. R.....	94
Table of Constants for CS ₂	722
" data for Siemens Gas, Water Gas, etc.....	674
" dimensions of Ferry-boats.....	198
" experiments with Sturtevant Fan.....	823
" filtering capacities of Hyatt Filter.....	628
" forces of Indicator Springs.....	513
" tests of Centrifugal Pumps.....	610
" " Harris-Corliss Engine.....	331
Tables from Nagle's formula.....	579
" of efficiency of Gearing.....	308
" " experiments with Belting.....	569-578
" " power required to move a Slide Valve.....	637
Taper for Bolts and Pins.....	396
" of Twist Drills.....	132
TAYLOR, F. W., <i>The Relative Value of Water Gas and Gas from the Siemens Producer for melting in the O. H. Furnace</i>	669
" " disc. <i>Experiments on Belting</i>	586
" " " <i>Shop-order System of Accounts</i>	475
" " " <i>Training of a Dynamic Engineer</i>	771
" " " <i>True Crank Shafts and Bearings</i>	524
Tellier and Flandrin Ammonia Engine.....	687
Test of Leavitt Pumping Engine at Lawrence.....	603
Testing Alignment of Engine Shafts and Pins.....	527
Testing Centrifugal Pumps.....	599
Tests of Centrifugal Pumps at Fas Bouches.....	605
<i>The Unexpected which often happens</i>	152
Theory of Heat Engines.....	710
Thermodynamics, Second Law of.....	726
Thermometer for Steam Temperatures.....	188
THORNE, W. H., <i>Twist Drills</i>	130
Thrust-bearings, Friction of.....	305
THURSTON, R. H., disc. <i>Crystallization of Iron</i>	246
" " " <i>Improvement in Ferry-boats</i>	204
" " " <i>Rating of Boilers by Horse-powers</i>	237
" " " <i>Steam Calorimeter</i>	185
" " " <i>Training of a Dynamic Engineer</i>	758
Tonnage of Grain in California.....	665
Topical Discussions, XIIth Meeting.....	375
No. 8. Condensation in non-Conducting Cylinders.....	375
" 9. Testing efficiency of small engines.....	380
" 10. Packing for Pneumatic Machinery.....	381
" 11. Substitutes for Steel in Springs.....	384
" 12. Domes on Locomotive Boilers.....	386
" 13. Descending Smoke-flues for Boilers.....	387
" 14. Burning anthracite culm.....	390
" 15. Drilling holes in Glass.....	392
" 16. Tapers for Bolts and Pins.....	396
" 17. Strain in hardened Steel.....	396

	PAGE
Topical Discussions, XIIIth Meeting.....	784
No. 18. Cams for Engine Valves.....	784
" 19. Load of Steel Tires on Steel Rails.....	785
" 20. Smoke-preventing Furnaces in Chicago.....	788
" 21. Foundations in yielding earth.....	797
" 22. Annular Jet for Ejector.....	804
" 23. Moulds for Printing-press Ink-rolls.....	806
" 24. Mechanical circulation of water in Steam Boilers.....	814
" 25. Condensation in Exhaust-pipe of a Steam Engine.....	816
" 26. Power to drive a Blower.....	822
TOWNE, H. R., <i>Engineer as an Economist</i>	428
" " disc. Descending Smoke-flues.....	390
" " " Drilling holes in Glass.....	394
" " " <i>Experiments on Belting</i>	585
" " " " <i>Gearing</i>	300
" " " <i>Handling Grain in California</i>	668
" " " Load on Tires.....	785
" " " Packing for Pneumatic Machinery.....	381
" " " Power to drive a Blower.....	824
" " " Substitutes for Steel in Springs.....	386
" " " Testing small engines.....	380
" " " <i>The Unexpected which often happens</i>	156
" " " <i>Transmission by Belting</i>	357
" " " <i>Valve Dynamometer</i>	646
" " " <i>Water Purification</i>	628
Tractive force in Meigs Elev. R.R.....	111
<i>Transmission of Power by Belting</i> (M. I. T. Exps.).....	347
" " " " (Sellers' Exps.).....	549
" " " " <i>Gearing</i>	273
Trevithick's Steam and Flue-gas Engine.....	691
Triple thermic Motor. <i>See</i> Bisulphide of carbon.....	
TROWBRIDGE, W. P., <i>On the Relative Economy of Ventilation by Heated</i> <i>Chimneys and by Fans</i>	531
" " <i>The Rating of Boilers by Horse-powers for Commer-</i> <i>cial Purposes</i>	214
" " disc. <i>Substitutes for Steam</i>	718
Turpentine for drilling Glass.....	393
Twist Drills.....	130
UNDERWOOD, F. H., disc. <i>Experiments on Belting</i>	586
" " " <i>Smoke-preventing Furnaces</i>	793
Unequal cooling of Steel.....	252
Uniformity in cupola mixtures.....	424
Uniform speed of Counter-shafts.....	146
Universal Joints in Marine Engine Shafts.....	526
<i>Valve Dynamometer, A New</i>	631
Valve, The Giddings Slide.....	640
<i>Vampire, The Locomotive</i>	704
Van Buren's Calorimeter.....	87
Ventilation of Hospitals and Public Buildings.....	540